SM 3H

SM3H Test Review 5.1-5.7

2017-18

Name _____ **Date** _____ **Period**_____

Evaluate the logarithm without a calculator. Show work!

1. $\log_6\left(\frac{1}{36}\right)$
2. $\log_8(32)$
3. $\log 0.0001$
4. $\log_{21}\sqrt{21}$
5. $\ln\frac{1}{\sqrt{e^{11}}}$
6. $\log_7 343$
7. $\log_6 6^2$
8. $e^{\ln 20}$
9. $\log_8\frac{1}{64}$
10. $\ln e$
11. $\log_{12}1$

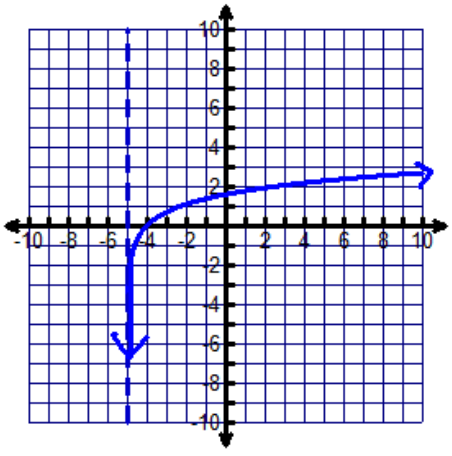
Find the following using a calculator. Round to the nearest ten thousandths.

12. $\log 32$
13. $\ln 0.98$
14. $\log(-3)$
15. $5^{3.2}$

Solve the equation by changing it to exponential form. Round to the nearest ten thousandths.

16. $\log_4 x = \frac{1}{2}$
17. $\log x = -4$
18. $\ln x = 2$

19. Determine the function that best describes the given graph.



a. $y = \ln x - 5$

b. $y = \ln(x - 5)$

c. $y = \ln x + 5$

d. $y = \ln(x + 5)$

20. Describe how to transform the graph of the basic function $g(x)$ into the graph of the given function $f(x)$.

$g(x) = \ln x;\ \ f(x) = \ln(-x) - 7$

Rewrite the expression as a sum or difference or multiple of logarithms.

21. $\log_2\left(5\sqrt[3]{12}\right)$

22. $\log_8\left(\dfrac{2x-3}{x^4}\right)$

Use the product, quotient and power rules of logarithms to rewrite the expression as a single logarithm. Assume that all variables represent positive real numbers.

23. $\log_3 6 - \log_3 a$

24. $4\log x + 2\log y$

25. $2\log_4 3 + \dfrac{1}{2}\log_4(x-5) - \dfrac{1}{3}\log_4 x$

Write the change of base rule to find the logarithm to the nearest ten thousandths.

26. $\log_{3.4} 210$

Write the expression in change of base using only the indicated logarithms.

27. $\log_4(x+y)$, use common logarithms

28. $\log_2 13$, use natural logarithms

Find the exact solutions to the equation. Show work.

29. $\log_4(x-2) = -1$

30. $3^{7x} = 243$

Solve each equation. Show work. Round to the nearest thousandths if necessary.

31. $\log_4(x+5) = 3$

32. $\log_3(x+4) - \log_3 4 = \log_3 22$

33. $\log_5 4 + \log_5(3x - 4) = 2$

34. $3e^{(2x-7)} = 8$

35. $\log\left(\frac{3}{5}x - 2\right) = 5$

36. $4^{(x-5)} + 4 = 9$

37. $\log_3(x - 1) - \log_3(2x - 5) = 0$

38. $\log_2(x^2 - 2x) = 3$

Find the inverse of each function. Show work.

39. $f(x) = \log(x+7) - 2$

40. $f(x) = 2\ln(8 - x) + 5$

41. $f(x) = \log_3(3x - 4) + 1$

42. $f(x) = 5^{x-3} + 2$

43. $f(x)=e^{4x-5}-7$

44. $f(x)=-2\cdot 3^{5-2x}+1$

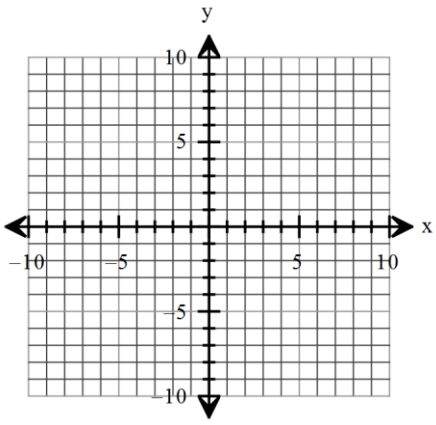
45. $f(x)=\frac{2x+3}{5x-2}$ Write the domain of the $f(x)$. Find $f^{-1}(x)$ and the domain of $f^{-1}(x)$.

46. What makes a function one-to-one?

47. Are the following functions inverses? (Need to show $f(g(x)) = x$ and $g(f(x)) = x$)

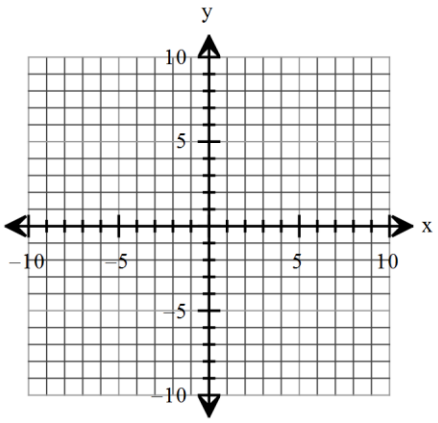
$f(x)=3x-6$ $\quad$ $g(x)=\frac{1}{3}x+2$

48. Graph $f(x)=\left(\frac{1}{2}\right)^{x-1}$ Identify the transformations, intercepts, asymptotes, domain and range. Use 3 key points.



49. Find the domain of $f(x)=\ln(10-x)$. Show work!

50. Graph $f(x)=\log_2 x+1$. Identify the transformations, intercepts, asymptotes, domain and range. Use 3 key points.



51. Find the amount which results from the following investment. $10,000 invested at 8% compounded quarterly after a period of 5 years.

52. The formula for a small bacteria population is $P(t)=400e^{.23t}$ After how many years will the population reach 2000?

53. The half-life of Wellsonium is 630 years. If 50 grams are present now how much will be present in 800 years? Round to the nearest hundredth.

Solve each equation using substitution. Show work. Show answer as exact and as a decimal rounded to the nearest four decimal places.

54. $e^{2x} - 2e^{x} - 3 = 0$

55. $3^{2x} + 3^{x} - 2 = 0$

56. Find $f \circ g(x)$ $\quad f(x) = \sqrt{x+2}$ $\quad g(x) = 2x^2 + 1$

57. $f(x) = \dfrac{x+1}{x-1}$ $\quad g(x) = \dfrac{1}{x}$ $\quad$ *Find domain of* $f \circ g$.